Advanced Cardiac Life Support

Advanced Provider Overview
Contact Information

- Judy Haluka, BS, RCIS, EMT-P
- Emsconed.org
- Jhaluka@emsconed.org
- Fax: 412-299-2026
- Regional Faculty – American Heart Association
  - ACLS – PALS – BCLS
References

• Currents in Emergency Cardiovascular Care (Winter 2005-2006)
• Circulation 2005;112:IV-1-IV-5) © American Heart Association
Basic Life Support

- Importance of Coronary Perfusion Pressure
- 30:2 Compression/Ventilation Ratio
- Complete Chest Recoil
- No Interruptions
- No Hyperventilation (6-8 without perfusion: 10-12 with perfusion)
Basic Cardiac Life Support

- Advanced Airway
  - 100 Compressions/min
  - 6-8 Ventilations/min
  - Push fast - push hard

- Switch Providers at 2 Minutes
Successful Resuscitation

- Survival to discharge from facility with near normal neurological function
  - 10 minute recommendation
  - 30 minute guideline
  - Excluding special circumstances
- Worked to pronouncement or ROSC - no transport with CPR
Primary Survey

- Airway
- Breathing
- Circulation
- Defibrillation
Secondary Survey

- **Airway** – Adequate/Obstructed
  - Determine if advanced airway needed
- **Breathing** – confirm airway placement
  - Pneumothorax, flail chest, open chest wound
  - Air movement - oxygenation
Secondary Survey

- Circulation
  - IV access
  - Monitor – determine rhythm and required treatment
  - Fluids – if indicated
Secondary Survey

• Differential Diagnosis
  - Determine cause of arrest or pre-arrest state
  - Institute definitive care based upon diagnosis
Secondary Survey - Advanced

- Disability
  - Mental status (glascow coma scale – stroke scale if indicated)

- Expose
  - Completely expose patient, check for injuries, lesions, temperature
  - Check extremity pulses
Secondary Survey - Advanced

- Fingers – Foley – Flip
  - Rectal, vaginal exam
  - Pelvic injuries
  - Flip patient to check back
  - Identify evidence of trauma, pregnancy, sources of bleeding
Secondary Survey - Advanced

- **Gastric Tube**
  - Check aspirate for blood, ingested tablets, toxins

- **History**
  - Document
  - Question family, friends, EMS personnel
• Oxygen – Monitor – IV – Fluids
  – Identify hypoxia, symptomatic arrhythmias, hypovolemia, treat and evaluate response to therapy
Temperature – Heart Rate – Blood Pressure – Respirations
- Support as needed, consider vasoactive therapy; evaluate response and adjust therapy
Quadradr Five

- Tank (volume)
- Tank (resistance)
- Pump (Failure)
- Rate
Ventricular Fibrillation

- Witnessed – immediate defibrillation
- Unwitnessed – CPR 2 minutes
- Defibrillation
  - 360 joules if monophasic
  - 200 joules – biphasic
    - One Defibrillation Only – NO MORE STACKED SHOCKS
Ventricular Fibrillation

- 2 minutes of CPR – no rhythm or pulse check
- Epinephrine 1mg q 3-5 minutes
- Vasopressin 40 units (single dose)
- Defibrillation
Ventricular Fibrillation

- Amiodarone 300mg IV (can be repeated once at $\frac{1}{2}$ dose)
- If unavailable – Lidocaine 1 to 1.5mg/kg; then half dose up to a maximum of 3 doses
- Defibrillation
Ventricular Fibrillation

- Consider Magnesium 1 to 2 grams
  - If prolonged QT interval with Torsades de Pointe arrest
  - Not routine administration
Ventricular Fibrillation

- Precordial Thump – not indicated
- Sodium Bicarbonate – no longer considered until ROSC with gases or special circumstances
- No routine fluid bolus
• Asystole – confirmation of death; absent special circumstances – not survivable

• Pulseless Electrical Activity
  – True EMD
  – Pseudo EMD
PEA/Asystole

- 2 Minutes of CPR
- Vasopressor
  - Epinephrine 1mg q 3-5 minutes
  - Vasopressin 40 units IV Push
- Atropine 1mg IVP if Asystole or Bradycardia
- Fluid Bolus if Tachycardia
PEA Differential

- Hypovolemia
- Hypoxia
- Hydrogen Ion (Acidosis)
- Hypo/Hyperkalemia
- Hypothermia
PEA Differential

- Toxins
- Tamponade
- Tension Pneumothorax
- Thrombosis (Coronary or Pulmonary)
- Trauma
Bradycardia

- Arrhythmias Don’t Kill – Heart Rate Does
- Assess for Adequate Perfusion
  - If adequate – monitor
  - If inadequate – intervene
    - Goal is increase in heart rate
    - Conversion is secondary
Bradycardia

- Atropine 0.5mg (to total of 3mg)
  - Note change in dosage
- Trancutaneous pacing
  - First line for High Degree AV blocks (Mobitz II and Third Degree)
- Consider Epinephrine (2-10mcgms/min) or Dopamine (2-10mcgms/min)
  - As a Bridge to definitive intervention only
Tachycardia - Unstable

- Narrow or Wide Complex
  - Immediate Cardioversion
Tachycardia – Narrow Complex

• Stable
• Regular Rhythm
  – Attempt Vagal Maneuvers
  – Adenosine 6mg IVP, 12mg, 12mg
    • Stopcock method
    • Extremely short half life
Tachycardia – Narrow Complex – Regular Rhythm

- Conversion with Adenosine
  - Probable Reentry SVT
  - Observe for recurrence
  - Treat recurrence with Adenosine
  - Long acting AV nodal blocking agent
    - Diltiazem, Beta Blockers
Tachycardia – Narrow Complex

- Does not Convert with Adenosine
- Possible Atrial Flutter, Atrial Tachycardia or Junctional Tachycardia
  - Control Rate (Diltiazem, Betal Blcokers)
  - Treat underlying cause
  - Consider EP Consult
Tachycardia – Narrow Complex
Irregular Rhythm

• Probable Atrial Fibrillation, Flutter or MAT
  - Consider EP consult
  - Control Rate with Diltiazem, Beta Blockers
Tachycardia – Wide Complex Stable

• Regular Rhythm
  – Probable Ventricular Tachycardia
  – Treat with Amioderone 150mg IV over 10 minutes (repeat as needed to maximum of 2.2 grams in 24 hours)
  – Prepare for elective cardioversion
  – If SVT with Aberrance – treat with Adenosine
Tachycardia – Wide Complex Irregular Rhythm

- Probable Atrial Fibrillation with Aberrancy
  - Treat as if narrow complex tachycardia
- If pre-excited Atrial Fibrillation (AF + WPW)
  - EP Consult Advised
  - Avoid AV Nodal Blockers (Adenosine, Verpamil, Diltiazem, Digoxin)
Tachycardia – Wide Complex Irregular Rhythm

- Consider Amiodarone 150mg IV over 10 minutes
- If Torsades de Pointe, consider Magnesium 1-2 grams over 5 – 60 minutes.
Acute Coronary Syndromes

- **ST Segment Elevation or new LBBB with Symptoms of AMI**
  - High specificity for evolving STEMI; assess for reperfusion candidacy

- **ST Depression**
  - Consistent with strong suggestion of ischemia; high risk subset of patients with unstable angina
Acute Coronary Syndromes

• Non-diagnostic ECG
  - Further assessment required
  - Serial enzymes; repeat ECG
  - Consider other causes of chest pain: aortic dissection, pericarditis/myocarditis, pulmonary embolism
AMI Reperfusion Guidelines

- ECG within 10 minutes
- Door to drug time less than 30 minutes
- Door to balloon time less than 90 minutes
AMI Protocol

• Oxygen – IV Access – Continuous ECG Monitoring
• Reperfusion Therapy (PCI or fibrinolytics) for STEMI
• Prompt Aspirin – 160mg to 325mg for all patients
• Beta blockade for all patients without contraindication
• IV NTG for initial 24-48 hours with AMI and CHF, large AWMI, persistent ischemia or hypertension
Potential Adjunctive Therapy

• Beta Blockers
  - Decreases myocardial oxygen consumption
  - Increases myocardial salvage in area of infarction
  - Can reduce VT and fibrillation
  - Benefits: 23% reduction in long term mortality
Heparin

- All patients undergoing PCI or surgical revascularization
- All patient receiving fibrinolytics
- IV or SQ low molecular weight in patients with NSTEMI
- IV unfractionated heparin for patients at increased risk of systemic emboli (atrial fib, large anterior MI, LV thrombus)
ACE Inhibitors

- Early oral therapy reduces mortality and CHF associated with AMI
- Helps prevent adverse LV remodeling
- Delays progression of heart failure
- Decreases sudden death
- Decreases recurrent MI
Cardiac Markers

- Myoglobin 1-2 hours
- Cardiac troponins 3-12 hours
- CK-MB 3-12 hours
NSTEMI – Adjunctive Therapy

• Low molecular Weight Heparin
  - Inhibits thrombin
  - Predictable results

• IIb/IIIa Inhibitors
  - Reduction in death and MI
  - Major benefits realized when PCI is planned
NSTEMI – Adjunctive Therapy

- **Plavix**
  - 300mg loading dose in addition to aspirin
  - Can substitute for ASA if true allergy

- **Statins**
  - Reduces incidence of reinfarction, recurrent angina, rehospitalization and stroke when administered within a few days of symptom onset
Airway Management

- Advanced airway (intubation) may be deferred until ROSC
  - Particularly if Anesthesia Personnel not available
  - Increased complication when intubated by non-anesthesia personnel
  - Complications directly related to number of intubations performed